

Lap shear adhesion measurements

LB Liming Bian XX Xiayi Xu

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 An abbreviated version of this protocol was published in Science Translational Medicine in Aug 2020

Bioadhesive hydrogels demonstrating pH-independent and ultrafast gelation promote gastric ulcer healing in pigs

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Detailed protocol

1. Peel off tissues.
2. Cut tissues into similar size according to the size of glass slides used (e.g. 2.5 cm × 2.5 cm).
3. Glue tissues firmly to one end of each glass slide.
4. Dissolve HA-Cat and HA-NCSN in PBS.
5. Mix the precursor with an equal volume of MT (Sigma-Aldrich) (100 units ml⁻¹ in PBS) and vortex the mixture immediately.
6. Apply the mixture to tissue surface on the glass slides.
7. Place two glass slides together oppositely to achieve overlap of two tissue surfaces in which one of the tissue surface is covered with hydrogel mixture.
8. Fasten the whole installation with two clips clipping two parallel edge of the overlapping area.
9. Incubate the whole installation at 37°C for some time to achieve uniform adhesion.
10. For lap shear strength measurements, pull the samples from two sides of two glass slides in one installation to failure using a tensile testing machine with a speed of 1 mm/min at room temperature.
11. Record the load (force) and displacement.
12. The lap shear strength is the highest intensity of adhesion force sensed by the tensile testing machine, that is the highest of force divided by the remaining overlapping area.

Notes: this protocol is aiming for measuring tissue adhesion. And this protocol is based on the enzymatic gelation of our HA-Cat-NCSN hydrogels. For other hydrogels, please make modifications depends on the situations.

How to cite: (Readers should cite both the Bio-protocol preprint and the original research article where this protocol was used)

1. Bian, L. and Xu, X. (2020). Lap shear adhesion measurements. Bio-protocol Preprint. bio-protocol.org/prep530.
2. Xu, X., Xia, X., Zhang, K., Rai, A., Li, Z., Zhao, P., Wei, K., Zou, L., Yang, B., Wong, W., Chiu, P. W. and Bian, L. (2020). Bioadhesive hydrogels demonstrating pH-independent and ultrafast gelation promote gastric ulcer healing in pigs. Science Translational Medicine 12(558). DOI: [10.1126/scitranslmed.aba8014](https://doi.org/10.1126/scitranslmed.aba8014)

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